

REMARKS

The Office Action rejects claims 1, 2, 5-8, 11, 12, 14, 15 and 22-30 under 35 U.S.C. 103(a) as being unpatentable over NIELSEN in view of ROLF et al. Reconsideration and withdraw of this rejection are respectfully requested for the following reasons:

Applicants respectfully suggest that the assertion in the Office Action that the combination of NIELSEN 6,175,096 and WO 96/23624 render obvious the claimed invention is clearly based on hindsight. Indeed, as readily acknowledged in the Office Action, NIELSEN is silent on the subject of using a gas mixture for cutting stainless steel and the other materials. As explicitly taught by NIELSEN, only pure gases can be used for cutting ordinary steel (specifically, oxygen) and stainless steel (specifically, nitrogen) when using a multiple focus lens (see col. 2, lines 53-56).

ROLF et al. teaches the use of nitrogen/oxygen mixtures for laser cutting stainless steels or other steels, and aluminum and its alloys, but only when cutting with a single focus lens.

However, as explained in the specification of the present invention (see, e.g., page 1, lines 30-39 to page 2, lines 1-5; page 4, lines 30-34; and page 5, lines 7-24), the improvement sought to be achieved with respect to the existing laser cutting processes using either a single focus lens, such as that of ROLF et al., or a multiple focus lens, such as that of

NIELSEN, was to further improve to the cutting speed, and the gas consumption, without any negative impact on the cut quality.

This problem was solved by the inventors of the present invention by combining, in a novel manner, a multiple focus objective in combination with a particular gas mixture ( $O_2/N_2$ ) with the aim of cutting particular materials.

Such a combination has never been attempted prior to the present invention, due at least in part to the fact that a skilled artisan would have no motivation whatsoever to combine the teachings of the ROLF et al. and NIELSEN references precisely because they deal with alternative technologies, i.e., NIELSEN teaches how to improve the cutting speed and gas consumption using a multiple focus lens with respect to a single focus lens process, whereas ROLF et al. teaches how to improve the cutting speed and gas consumption, using a  $N_2/O_2$  gas mixture, with respect to pure gas, but only in the context of a single focus lens process.

Furthermore, NIELSEN clearly teaches that, when using a multiple focus lens, only pure gases should be used. Accordingly, this teaches directly away from the present invention as claimed. Were one to start from the perspective of the combination of the references and end up at the present invention, it would be necessary to pursue a path that runs entirely contrary to the teachings of NIELSEN.

Such conclusion is readily supported by the search report of the ROLF et al. reference itself, in which another patent of S.E. NIELSEN is cited, namely US 4,724,297 (the '297 patent). When considering the teachings of the '297 patent, it becomes clear that S.E. NIELSEN first developed in 1988 a laser cutting process of high alloys or stainless steel using a gas mixture containing O<sub>2</sub> and an inert gas such as nitrogen, producing the result of a high cutting speed and no burr. In 1996, when S.E. NIELSEN developed his second process (US 6,175,096), he did not disclose or suggest that N<sub>2</sub>/O<sub>2</sub> mixtures can be used with a multiple focus lens in order to further improve the cutting process, the gas consumption, and the quality of the cut.

In other words, despite the fact that NIELSEN was perfectly aware that gas mixtures can be useful in certain circumstances to improve the cutting speed and the cut quality (no burr), he did not mention that in the frame of US '096 (issued approximately eight years after US '297) and, in contrast, advocated in US '096 to use pure gases in combination with a multiple focus lens.

In addition to the analysis provided above, Applicant includes herewith a declaration under Rule 132 by Erik Nielsen, the sole inventor named in the primary NIELSEN reference. Applicants suggest that it is remarkable that the inventor named in an applied in reference is making a formal statement on the

record as to the insufficiency of his own patent, combined with a secondary reference, to render obvious the claims of the present application. As Mr. Nielsen points out in his declaration, he has no personal interest in the present application, but was so moved by what he considered to be the inequity in the rejection based on his patent that he executed the declaration included herein.

As Mr. Nielsen points out in his declaration, when he was performing the research that underlies the invention disclosed and recited therein, he was working with the Dual Focus (DF) technique, but only in combination with pure gases. He states further that when he was performing the research underlying the NIELSEN patent method, he knew that combined nitrogen/oxygen mixtures were being used for the laser cutting of stainless steels, aluminum, or similar materials, but only in connection with a mono-focal lens. Significantly, he states that in spite of that knowledge, as one of skill in the art, of the use of nitrogen/oxygen mixtures, he never considered using mixed gasses in connection with the DF technique. Accordingly, the declarant, as one of skill in the art, was clearly aware of the DF technique upon which he was performing research, as well as the use of mixtures of nitrogen and oxygen in connection with a mono-focal technique, but was not persuaded as one of skill in the art to combine the two to use the recited nitrogen/oxygen mixture with a DF laser cutting technique.

Applicants include herewith a second declaration, this one executed by Olivier Matile, one of the named inventors in the present invention. The substance of this declaration includes the points made by Mr. Nielsen in his declaration, and furthermore points out the unexpected nature of the results that came from combining a Dual Focus laser cutting technique with a nitrogen/oxygen mixture, as recited in the present claims. Mr. Matile also points out in his declaration that the cutting properties of a multi-focal lens are very different from those of the mono-focal type, particularly due to the repartition of energy in the thickness to be cut, which is different between the two approaches. Mr. Matile also points out in additional detail why the nature of multi-focus and mono-focal lenses are of sufficient difference that one of skill in the art would not be motivated to combine the gas mixture always used in the prior art in connection with a mono-focal lens with a multi-focus laser cutting device.

Applicants therefore respectfully suggest that the combination of the teachings of the two references to produce the present invention as claimed can be supported only when the substance of the present specification is used to link the two. This, of course, constitutes impermissible hindsight, and for at least this reason, the Applicants respectfully suggest that the present obviousness rejection cannot be maintained.

The Office Action rejects claim 9 under 35 USC §103(a) as being unpatentable over the references applied in the previous obviousness rejection, and further in view of McNEILL. Reconsideration and withdrawal of this rejection are respectfully requested for the following reasons:

The additional McNEILL reference is offered merely for its asserted teaching or suggestion of a nitrogen/oxygen mixture obtained from air treated by a membrane system. However, regardless of the ability of the McNEILL reference to teach or suggest that for which it is offered, it fails to overcome the significant shortcomings of the combination of the NIELSEN and ROLF et al. references, as detailed above. Accordingly, applicants respectfully suggest that the combination of three references cannot reasonably be considered as rendering obvious rejected claim 9.

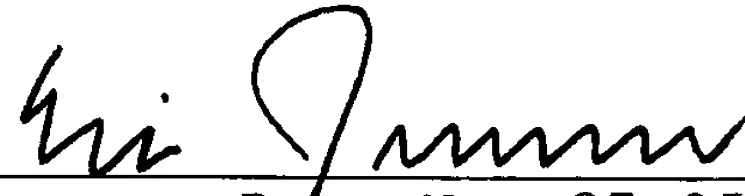
Entry of the above amendments is earnestly solicited. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any

overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON



---

Eric Jensen, Reg. No. 37,855  
745 South 23<sup>rd</sup> Street  
Arlington, VA 22202  
Telephone (703) 521-2297  
Telefax (703) 685-0573  
(703) 979-4709

EJ/psf